| EXAMINED BY :

Vincent Uh	EMERGING DISPLAY	FILE NO . CAS-0007026
		ISSUE : APR.02, 2010
APPROVED BY:

David Chang | TECHNOLOGIES CORPORATION | TOTAL PAGE : 24 |
| | | VERSION : 2 |

CUSTOMER   ACCEPTANCE   SPECIFICATIONS

MODEL   NO. :

E T 0 3 2 0 A 5 D M 9
(RoHS)

FOR   MESSRS :

_____

CUSTOMER'S APPROVAL

DATE :

_____

BY :

_____

RECORDS OF REVISION	DOC. FIRST ISSUE
	DEC.25, 2009

DATE	REVISED PAGE NO.	SUMMARY
APR.02, 2010	3	4. ELECTRICAL CHARACTERISTICS POWER SUPPLY CURRENT：TYP.=(15) → 10, MAX.=(20) → 15 POWER SUPPLY FOR LED BACKLIGHT：TYP.=(19.6) → 21, MAX.=(21) → —
	6	6.1 OPTICAL CHARACTERISTICS

ITEM		SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	REMARK
VIEWING ANGLE		θx+	CR≥10 θy=0°	(50)	(55)	—	deg.	NOTE (2) NOTE (3)
		θx-		(70)	(75)	—		
		θy+	θx=0°	(67)	(72)	—		
		θy-		(67)	(72)	—		
CONTRAST RATIO		CR	θx = θy = 0°	(330)	(500)	—	—	NOTE (3)
RESPONSE TIME		T g	θx = θy = 0°	—	(12)	(16)	ms	NOTE (4)
		T r		—	(18)	(24)		
COLOR OF CIE COORDINATE	WHITE	Wx	θx = θy = 0° IF=20mA NTSC=60%	(0.25)	(0.30)	(0.35)	—	NOTE (5)
		Wy		(0.29)	(0.34)	(0.39)		
	RED	Rx		(0.59)	(0.64)	(0.69)	—	
		Ry		(0.30)	(0.35)	(0.40)		
	GREEN	Gx		(0.29)	(0.34)	(0.39)	—	
		Gy		(0.56)	(0.61)	(0.66)		
	BLUE	Bx		(0.09)	(0.14)	(0.19)	—	
		By		(0.05)	(0.10)	(0.15)		
THE BRIGHTNESS OF MODULE		B	θx = θy = 0° IF=20mA	(300)	(350)	—	cd/m²	NOTE (6)

ITEM		SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	REMARK
VIEWING ANGLE		θx+	CR≥10 θy=0°	56	63	—	deg.	NOTE (2) NOTE (3)
		θx-		63	70	—		
		θy+	θx=0°	58	65	—		
		θy-		65	72	—		
CONTRAST RATIO		CR	θx = θy = 0°	325	450	—	—	NOTE (3)
RESPONSE TIME		T g	θx = θy = 0°	—	5	10	ms	NOTE (4)
		T r		—	15	30		
COLOR OF CIE COORDINATE	WHITE	Wx	θx = θy = 0° IF=20mA NTSC=60%	0.27	0.32	0.37	—	NOTE (5)
		Wy		0.30	0.35	0.40		
	RED	Rx		0.58	0.63	0.68	—	
		Ry		0.30	0.35	0.40		
	GREEN	Gx		0.30	0.35	0.40	—	
		Gy		0.54	0.59	0.64		
	BLUE	Bx		0.10	0.15	0.20	—	
		By		0.04	0.09	0.14		
THE BRIGHTNESS OF MODULE		B	θx = θy = 0° IF=20mA	320	350	—	cd/m²	NOTE (6)

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1.   GENERAL SPECIFICATIONS

1 . 1   APPLICATION NOTES FOR CONTROLLER/DRIVER
PLEASE REFER TO :

ILITEK   ILI9325C

1 . 2   MATERIAL SAFETY DESCRIPTION
ASSEMBLIES SHALL COMPLY WITH EUROPEAN ROHS REQUIREMENTS,
INCLUDING PROHIBITED MATERIALS/COMPONENTS CONTAINING LEAD,
MERCURY, CADMIUM, HEXAVALENT CHROMIUM, POLYBROMINATED
BIPHENYLS (PBB) AND POLYBROMINATED DIPHENYL ETHERS (PBDE)

2 .   MECHANICAL SPECIFICATIONS

(1) DIAGONALS   -------------------------------- 3.2 inch

(2) NUMBER OF DOTS   ------------------------- 240W * (RGB) * 320H DOTS

(3) MODULE SIZE   -------------------------------- 55.14W * 76.8H * 6D(MAX.) mm

(WITHOUT FPC)

(4) EFFECTIVE AREA   --------------------------- 50.6W * 66.8H mm

(5) ACTIVE AREA   -------------------------------- 48.6W * 64.8H mm

(6) DOT SIZE   --------------------------------------- 0.0675W * 0.2025H mm

(7) PIXEL SIZE   ------------------------------------- 0.2025W * 0.2025H mm

(8) LCD TYPE   --------------------------------- TFT , TRANSMISSIVE

(9) COLOR   ------------------------------------- 262K

(10) VIEWING DIRECTION   --------------------- 9 O'CLOCK

(11) BACK LIGHT   -------------------------------- LED , COLOR : WHITE

(12) INTERFACE MODE   -------------------------- MPU 18/16/9/8 BIT PARALLEL (i80 SYSTEM)

/SERIAL PERIPHERAL INTERFACE (SPI)

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3. ABSOLUTE MAXIMUM RATINGS

3.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS.

PARAMETER	SYMBOL	MIN.	MAX.	UNIT	REMARK
POWER SUPPLY FOR DIGITAL VOLTAGE	IOVCC−VSS	-0.3	4.6	V	
POWER SUPPLY FOR ANALOG VOLTAGE	VCI−VSS	-0.3	4.6	V	
INPUT VOLTAGE	VIN−VSS	-0.3	IOVCC+0.3	V	
STATIC ELECTRICITY	—	—	—	V	NOTE (1)
LED BACKLIGHT POWER DISSIPATION	PD	—	630	mW	
LED BACKLIGHT FORWARD CURRENT	IF	—	30	mA	
LED BACKLIGHT REVERSE VOLTAGE	VR	—	30	V	

NOTE(1) : LCM SHOULD BE GROUNDED DURING HANDING LCM.

3.2 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS.

ITEM	OPERATING		STORAGE		REMARK
	MIN.	MAX.	MIN.	MAX.	
AMBIENT TEMPERATURE	-20°C	70°C	-30°C	80°C	NOTE (1) , (2)
HUMIDITY	NOTE (3)		NOTE (3)		WITHOUT CONDENSATION
VIBRATION	—	2.45m/S^2 (0.25G)	—	11.76m/S^2 (1.2 G)	5~20Hz , 1HR 20~500Hz(20Hz) , 1HR 20~500Hz(500Hz) , 1HR X,Y,Z TOTAL 3HRS
SHOCK	—	29.4 m/S^2 (3G)	—	490m/S^2 (50 G)	10 mSECONDS XYZ DIRECTIONS 1 TIME EACH
CORROSIVE GAS	NOT ACCEPTABLE		NOT ACCEPTABLE		

NOTE (1) : Ta AT -30°C : 48HRS MAX .
　　　　　　　　　 80°C : 168HRS MAX .
NOTE (2) : BACKGROUND COLOR CHANGES SLIGHTLY DEPENDING ON AMBIENT
　　　　　　　 TEMPERATURE THIS PHENOMENON IS REVERSIBLE .
NOTE (3) : Ta ≤ 60°C : 90%RH (96HRS MAX .)
　　　　　　　 Ta > 60°C : ABSOLUTE HUMIDITY MUST BE LOWER THAN THE HUMIDITY OF
　　　　　　　　　 90%RH AT 60°C.(96 HRS MAX.)

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4．ELECTRICAL CHARACTERISTICS

Ta = 25 °C

PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
POWER SUPPLY FOR DIGITAL	IOVCC-VSS	—	2.7	3.0	3.3	V
POWER SUPPLY FOR ANALOG	VCI-VSS	—	2.7	3.0	3.3	V
INPUT VOLTAGE NOTE (1)	VIH	IOVCC-VSS = 2.7~3.3V	0.7IOVCC	—	IOVCC	V
	VIL		0	—	0.3IOVCC	V
OUTPUT VOLTAGE NOTE (2)	VOH	I_{OH} = -0.1mA	0.8IOVCC	—	—	V
	VOL	IOVCC-VSS=2.7~3.3V I_{OL} = 0.1mA	—	—	0.2IOVCC	V
POWER SUPPLY CURRENT NOTE (3)，(4)	ICC	—	—	10	15	mA
POWER SUPPLY FOR LED BACKLIGHT，NOTE (5)	VLED-VLSS	IF = 20mA	—	21	—	V
LED LIFE TIME	—	—	30000	40000	—	HRS

NOTE (1) : APPLIED TO TERMINALS nCS, nRS, nWR/SCL, nRD, SDI, DB0~DB17, nRESET, IM3~IM1, IM0/ID.
NOTE (2) : APPLIED TO TERMINALS DB0~DB17.
NOTE (3) : ICC : I_{IOVCC} + I_{VCI}
NOTE (4) : THE DISPLAY PATTERN IS ALL "WHITE".
NOTE (5) : INTERNAL CIRCUIT DIAGRAM OF BACKLIGHT

VLED o—▷│—▷│—▷│—▷│—▷│—▷│—o VLSS
(6 LED CHIPS)
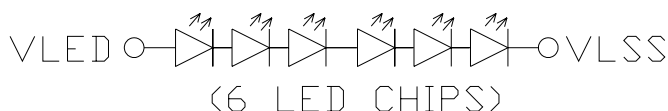
NOTE (6) : AMBIENT TEMP. VS. ALLOWABLE FORWARD CURRENT. (PER LED)

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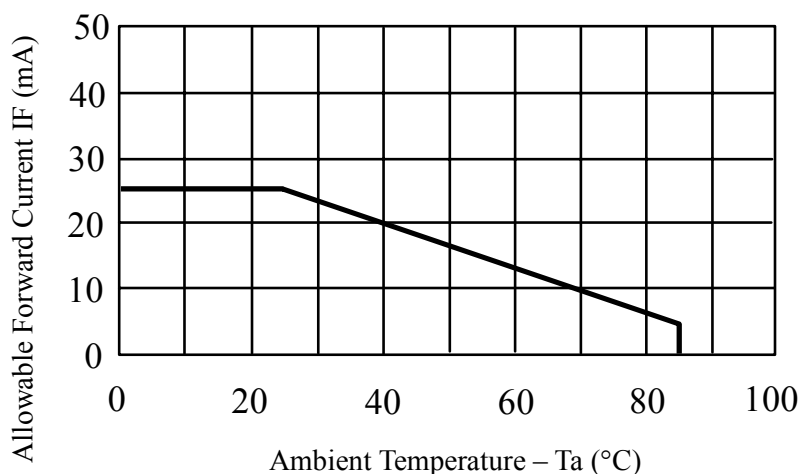
5 .   TIMING CHARACTERISTICS
5.1 i80-SYSTEM INTERFACE TIMING CHARACTERISTICS

ITEM		SYMBOL	MIN.	TYP.	MAX.	UNIT.
BUS CYCLE TIME	WRITE	t_{CYCW}	80	—	—	ns
	READ	t_{CYCR}	300	—	—	ns
WRITE LOW-LEVEL PULSE WIDTH		PW_{LW}	50	—	500	ns
WRITE HIGH-LEVEL PULSE WIDTH		PW_{HW}	15	—	—	ns
READ LOW-LEVEL PULSE WIDTH		PW_{LR}	150	—	—	ns
READ HIGH-LEVEL PULSE WIDTH		PW_{HR}	150	—	—	ns
WRITE / READ RISE / FALL TIME		t_{WRr} / t_{WRf}	—	—	25	ns
SETUP TIME	WRITE (RS to nCS, nWR)	t_{AS}	10	—	—	ns
	READ (RS to nCS, nRD)		5	—	—	ns
ADDRESS HOLD TIME		t_{AH}	5	—	—	ns
WRITE DATA SETUP TIME		t_{DSW}	10	—	—	ns
WRITE DATA HOLD TIME		t_{H}	15	—	—	ns
READ DATA DELAY TIME		t_{DDR}	—	—	100	ns
READ DATA HOLD TIME		t_{DHR}	5	—	—	ns

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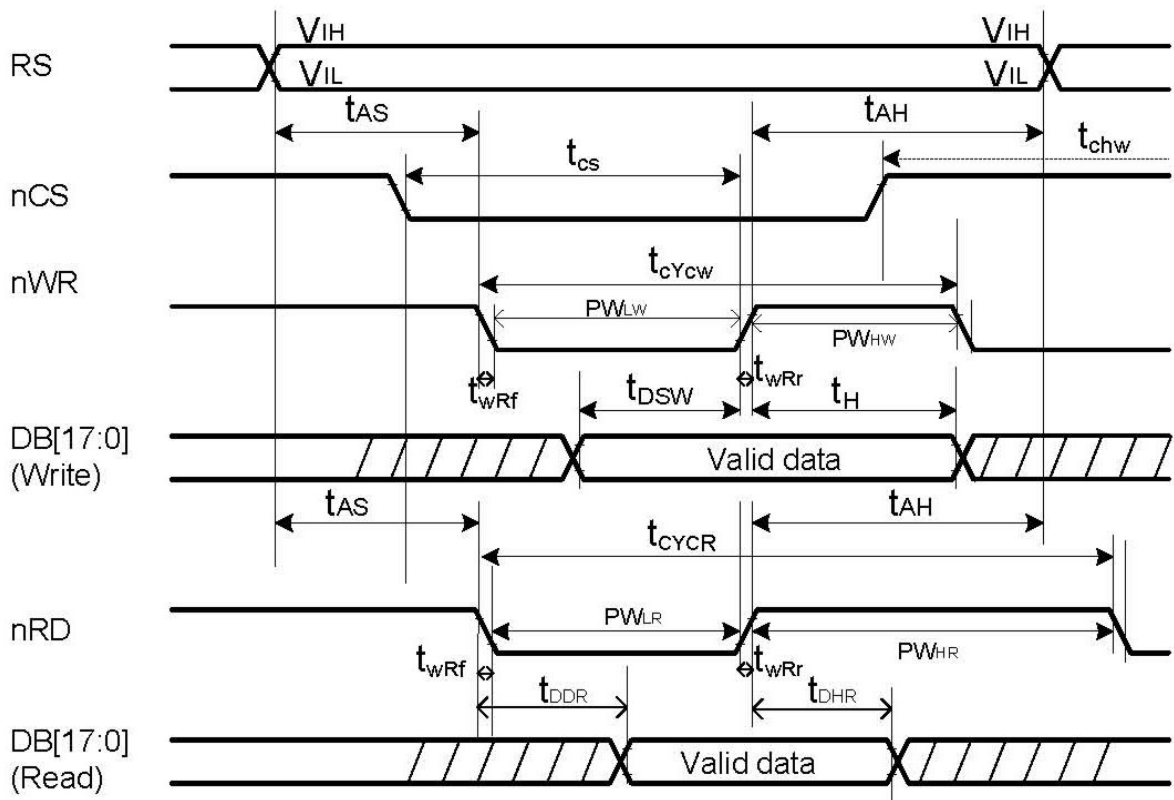
5.2 SERIAL DATA TRANSFER INTERFACE TIMING CHARACTERISTICS

ITEM		SYMBOL	MIN.	TYP.	MAX.	UNIT.
SERIAL CLOCK CYCLE TIME	WRITE (RECEIVED)	t_{SCYC}	50	—	—	μs
	READ (TRANSMITTED)	t_{SCYC}	200	—	—	μs
SERIAL CLOCK HIGH – LEVEL PULSE WIDTH	WRITE (RECEIVED)	t_{SCH}	40	—	—	ns
	READ (TRANSMITTED)	t_{SCH}	100	—	—	ns
SERAL CLOCK LOW – LEVEL PULSE WIDTH	WRITE (RECEIVED)	t_{SCL}	40	—	—	ns
	READ (TRANSMITTED)	t_{SCL}	100	—	—	ns
SERAL CLOCK RISE / FALL TIME		t_{SCr}, t_{SCf}	—	—	5	ns
CHIP SELECT SETUP TIME		t_{CSU}	10	—	—	ns
CHIP SELECT HOLD TIME		t_{CH}	50	—	—	ns
SERIAL INPUT DATA SETUP TIME		t_{SISU}	20	—	—	ns
SERIAL INPUT DATA HOLD TIME		t_{SIH}	20	—	—	ns
SERIAL OUTPUT DATA SETUP TIME		t_{SOD}	—	—	100	ns
SERIAL OUTPUT DATA HOLD TIME		t_{SOH}	5	—	—	ns
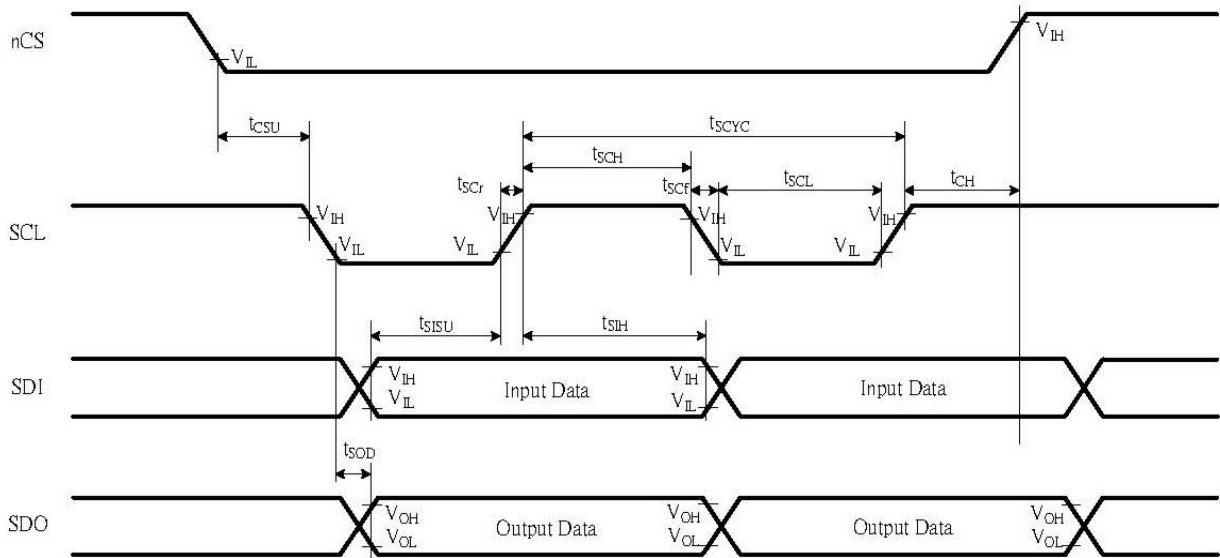
5.3 RESET TIMING CHARACTERISTICS

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT.
RESET LOW-LEVEL WIDTH	t_{RES_L}	1	—	—	ms
RESET RISE TIME	t_{rRES}	—	—	10	μs
RESET HIGH-LEVEL WIDTH	t_{RES_H}	50	—	—	ms

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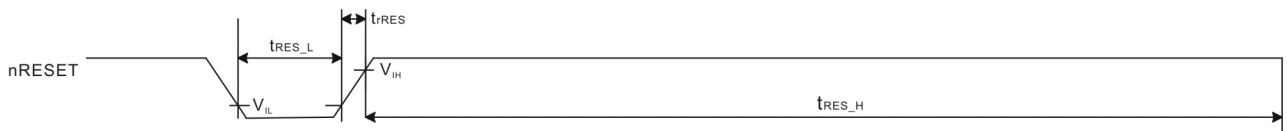
6. OPTICAL CHARACTERISTICS (NOTE 1)
6.1 OPTICAL CHARACTERISTICS

Ta = 2 5 °C

ITEM		SYMBOL	CONDITION		MIN.	TYP.	MAX.	UNIT	REMARK
VIEWING ANGLE		$\theta x+$	CR≥10	$\theta y=0°$	56	63	—	deg.	NOTE (2) NOTE (3)
		$\theta x-$			63	70	—		
		$\theta y+$		$\theta x=0°$	58	65	—		
		$\theta y-$			65	72	—		
CONTRAST RATIO		CR	$\theta x = \theta y = 0°$		325	450	—	—	NOTE (3)
RESPONSE TIME		T_R	$\theta x = \theta y = 0°$		—	5	10	ms	NOTE (4)
		T_F			—	15	30		
COLOR OF CIE COORDINATE	WHITE	Wx	$\theta x = \theta y = 0°$ IF=20mA NTSC=60%		0.27	0.32	0.37	—	NOTE (5)
		Wy			0.30	0.35	0.40		
	RED	Rx			0.58	0.63	0.68	—	
		Ry			0.30	0.35	0.40		
	GREEN	Gx			0.30	0.35	0.40	—	
		Gy			0.54	0.59	0.64		
	BLUE	Bx			0.10	0.15	0.20	—	
		By			0.04	0.09	0.14		
THE BRIGHTNESS OF MODULE		B	$\theta x = \theta y = 0°$ IF=20mA		320	350	—	cd/m²	NOTE (6)
THE UNIFORMITY OF MODULE		—			75	80	—	%	

NOTE (1) : TEST EQUIPMENT SETUP :
AFTER STABILIZING AND LEAVING THE PANEL ALONE AT A GIVEN TEMPERATURE FOR 30 MINUTES, THE MEASUREMENT SHOULD BE EXECUTED. MEASUREMENT SHOULD BE EXECUTED IN A STABLE, WINDLESS, AND DARK ROOM. OPTICAL SPECIFICATIONS ARE MEASURED BY TOPCON BM-7 (FAST) WITH A VIEWING ANGLE OF 1° AT A DISTANCE OF 50cm AND NORMAL DIRECTION.

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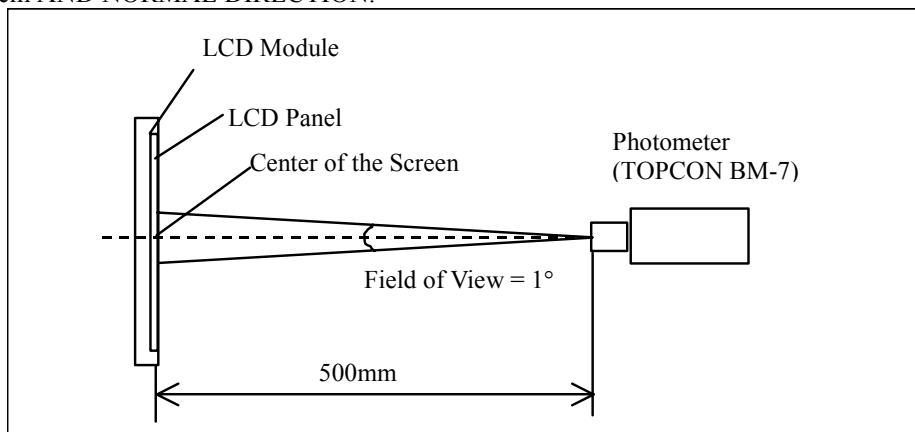
NOTE (2) : DEFINITION OF VIEWING ANGLE :
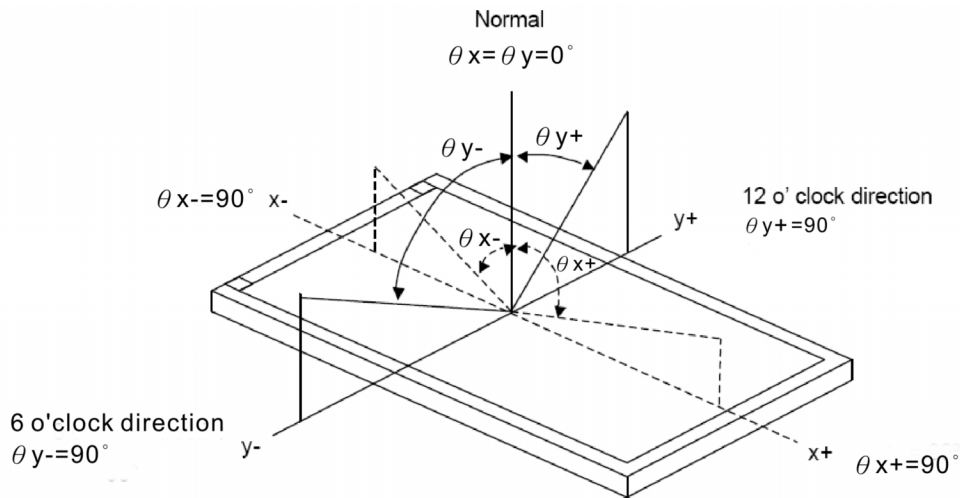
NOTE (3) : DEFINITION OF CONTRAST RATIO :

$$\text{CONTRAST RATIO(CR)} = \frac{\text{BRIGHTNESS MEASURED WHEN LCD IS AT "WHITE STATE"}}{\text{BRIGHTNESS MEASURED WHEN LCD IS AT "BLACK STATE"}}$$

NOTE (4) : DEFINITION OF RESPONSE TIME : T_R AND T_F

THE FIGURE BELOW IS THE OUTPUT SIGNAL OF THE PHOTO DETECTOR.
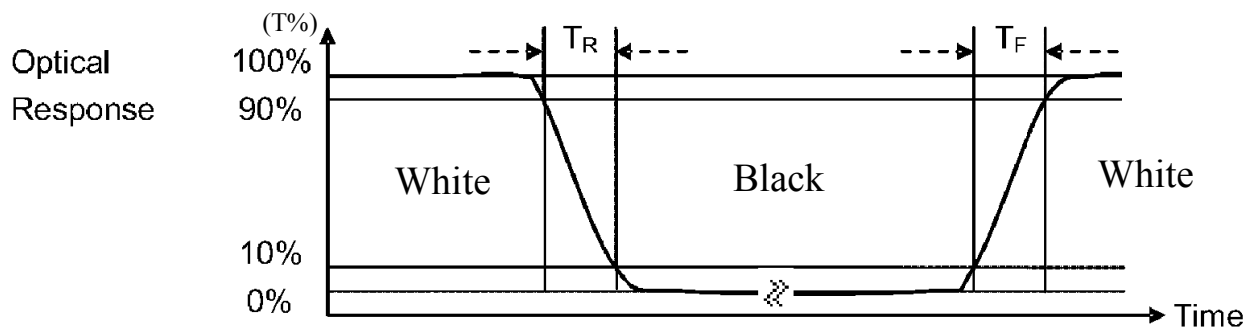
NOTE (5) : THE 100% TRANSMISSION IS DEFINED AS THE TRANSMISSION OF LCD PANEL WHEN ALL
THE INPUT TERMINALS OF MODULE ARE ELECTRICALLY OPENED.

NOTE (6) : BRIGHTNESS MEASURED WHEN LCD IS AT "WHITE STATE"

6.2   THE TEST METHOD OF BRIGHTNESS AND UNIFORMITY

UNIT：mm
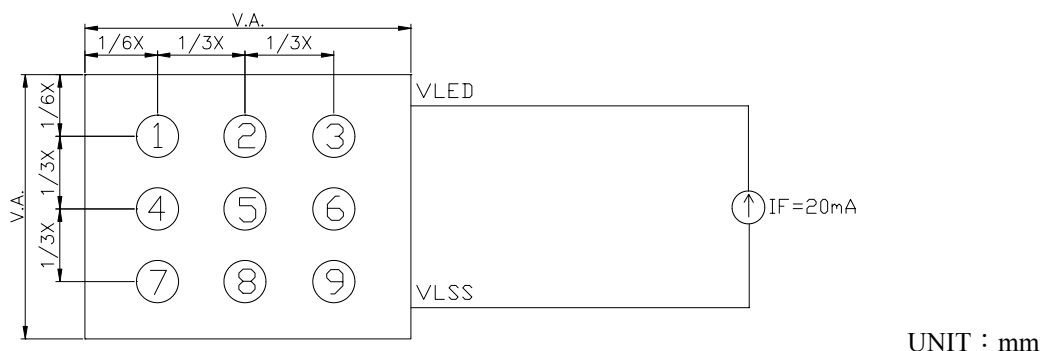
6.3   THE CALCULATING METHOD OF UNIFORMITY

$$\text{UNIFORMITY} : \left[1 - \frac{\text{MAXIMUM BRIGHTNESS} - \text{MINIMUM BRIGHTNESS}}{\text{AVERAGE BRIGHTNESS}}\right] \times 100\%$$

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7. OUTLINE DIMENSIONS

240(RGB)*320 DOTS

VIEWING DIRECTION

Best Contrast but with Gray Level Inversion

55.14±0.5
V.A. 50.6±0.3
A.A. 48.6±0.1
(27.57)
2.27
3.27

3.2
2.2
(35.6)
A.A. 64.8±0.1
V.A. 66.8±0.3
76.8±0.5

15±0.5
12.6±0.1
8.7±0.5
3.7±0.5
(0.5)
(1)

SINGLE LAYER AREA

6 MAX.
4.1±0.3

COMPONENT AREA
H=1.5 MAX.

(20)
(15.25)
(4.5)
(15)
Ø1±0.1(*2)
(42.02)
DETAIL A

STIFFENER
0.8±0.1(*2)
0.2±0.05
CONTACT SIDE
COMPONENT

UNIT : mm
SCALE : NTS
NOT SPECIFIED TOLERANCE IS ± 0.3
NOTE :
RECOMMEND MATCH CONNECTOR
KYOCERA : 04 6281 241 SERIES

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2.5±0.3

41

0.3±0.07

0.3+0.04/-0.03

P0.3*(41-1)=12±0.05

12.6±0.1

1

DETAIL A
SCALE 10:1

R0.3 (*2) MAX.

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8 . BLOCK DIMENSION

9. DETAIL DRAWING OF DOT MATRIX

UNIT : mm
SCALE : NTS
NOT SPECIFIED TOLERANCE IS ± 0.1
DOTS MATRIX TOLERANCE IS ± 0.01

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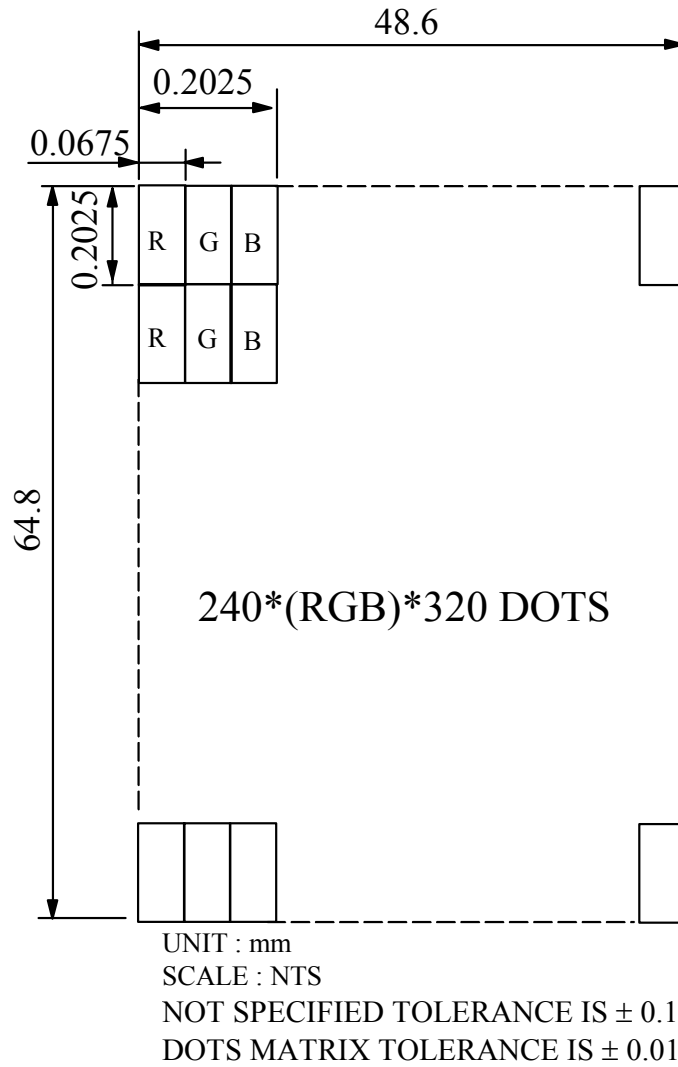
10. INTERFACE SIGNALS

PIN NO	SYMBOL	FUNCTION
1	VCI	POWER SUPPLY FOR ANALOG CIRCUIT
2~4	VSS	GROUND
5	IOVCC	POWER SUPPLY FOR INTERFACE SIGNAL
6	NC	NON CONNECTION
7	nCS	A CHIP SELECT SIGNAL. LOW: THE ILI9325C IS SELECTED AND ACCESSIBLE. HIGH: THE ILI9325C IS NOT SELECTED AND NOT ACCESSIBLE. FIX TO THE VSS LEVEL WHEN NOT IN USE.
8	RS	A REGISTER SELECT SIGNAL. LOW：SELECT AN INDEX OR STATUS REGISTER. HIGH：SELECT A CONTROL REGISTER. FIX TO EITHER IOVCC OR VSS LEVEL WHEN NOT IN USE.
9	nWR/SCL	A WRITE STROBE SIGNAL AND ENABLES AN OPERATION TO WRITE DATA WHEN THE SIGNAL IS LOW. FIX TO EITHER IOVCC OR VSS LEVEL WHEN NOT IN USE. SPI MODE：SYNCHRONIZING CLOCK SIGNAL IN SPI MODE.
10	nRD	A READ STROBE SIGNAL AND ENABLES AN OPERATION TO READ OUT DATA WHEN THE SIGNAL IS LOW. FIX TO EITHER IOVCC OR VSS LEVEL WHEN NOT IN USE.
11	SDI/SDA	SPI INTERFACE INPUT PIN. THE DATA IS LATCHED ON THE RISING EDGE OF THE SCL SIGNAL. IN THE 8/9-BIT SERIAL PERIPHERAL INTERFACE, THIS PIN IS USED AS BI-DIRECTIONAL DATA PIN.
12	SDO	SPI INTERFACE OUTPUT PIN. THE DATA IS OUTPUTTED ON THE FALLING EDGE OF THE SCL SIGNAL. LET SDO AS OPEN WHEN NOT IN USE.
13	DB0	
14	DB1	
15	DB2	
16	DB3	
17	DB4	
18	DB5	AN 18-BIT PARALLEL BI-DIRECTIONAL DATA BUS FOR MPU SYSTEM INTERFACE MODE.
19	DB6	8-BIT I/F：DB[17：10]IS USED.
20	DB7	9-BIT I/F：DB[17：9]IS USED.
21	DB8	16-BIT I/F：DB[17：10]AND DB[8：1]IS USED.
22	DB9	18-BIT I/F：DB[17：0]IS USED.
23	DB10	UNUSED PINS MUST BE FIXED VSS LEVEL.
24	DB11	
25	DB12	
26	DB13	
27	DB14	
28	DB15	
29	DB16	
30	DB17	

PIN NO	SYMBOL	FUNCTION					
31	nRESET	A RESET PIN. INITIALIZES THE ILI9325C WITH A LOW INPUT.BE SURE TO EXECUTE A POWER-ON RESET AFTER SUPPLYING POWER.					
32	IM3	SELECT THE MPU SYSTEM INTERFACE MODE					
33	IM2	IM3	IM2	IM1	IM0	MPU-INTERFACE MODE	DB PIN IN USE
34	IM1	0	0	0	0	SETTING INVALID	
35	IM0/ID	0	0	0	1	SETTING INVALID	
		0	0	1	0	i80-SYSTEM 16-BIT INTERFACE	DB[17:10], DB[8:1]
		0	0	1	1	i80-SYSTEM 8-BIT INTERFACE	DB[17:10]
		0	1	0	ID	SERIAL PERIPHERAL INTERFACE (SPI)	SDI, SDO
		0	1	1	0	9-BIT 3 WIRES SERIAL PERIPHERAL INTERFACE	SDA, SCL, nCS
		0	1	1	1	8-BIT 4 WIRES SERIAL PERIPHERAL INTERFACE	SDA, SCL, nCS, RS
		1	0	0	0	SETTING INVALID	
		1	0	0	1	SETTING INVALID	
		1	0	1	0	i80-SYSTEM 18-BIT INTERFACE	DB[17:0]
		1	0	1	1	i80-SYSTEM 9-BIT INTERFACE	DB[17:9]
		1	1	*	*	SETTING INVALID	
		WHEN THE SERIAL PERIPHERAL INTERFACE IS SELECTED, IM0 PIN IS USED FOR THE DEVICE CODE ID SETTING					
36	VLED	POWER SUPPLY FOR LED BACKLIGHT (ANODE)					
37	VLSS	POWER SUPPLY FOR LED BACKLIGHT (CATHODE)					
38	NC	NON CONNECTION					
39	NC	NON CONNECTION					
40	NC	NON CONNECTION					
41	NC	NON CONNECTION					

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11．POWER SUPPLY

11.1 POWER SUPPLY FOR LCD MODULE
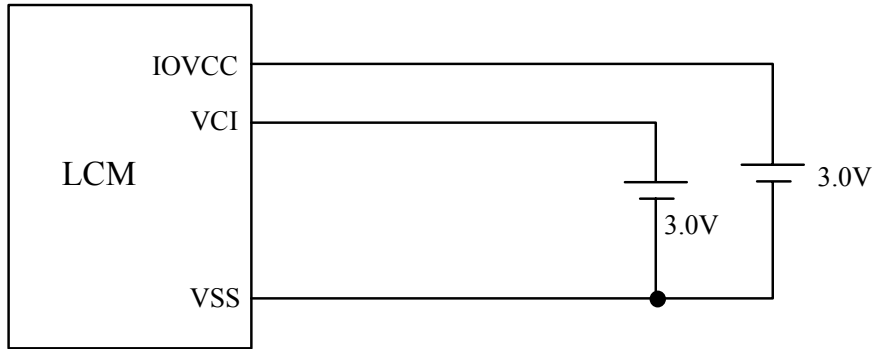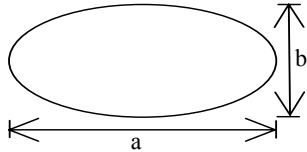

11.2 POWER SUPPLY FOR LED BACKLIGHT

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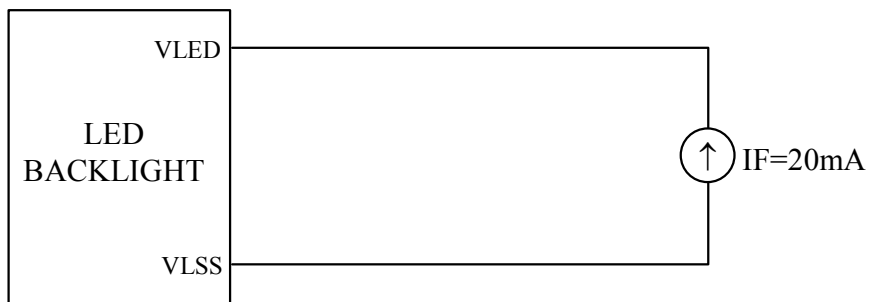
１２． INSPECTION CRITERION

  12.1 APPLICATION

    THIS INSPECTION STANDARD IS TO BE APPLIED TO THE LCD MODULE
    DELIVERED FROM EMERGING DISPLAY TECHNOLOGIES CORP.(E.D.T) TO
    CUSTOMERS

  12.2 INSPECTION CONDITIONS

    12.2.1 (1)OBSERVATION DISTANCE : 35cm±5cm
           (2)VIEW ANGLE :
             NON-OPERATION CONDITION : ±5°(PERPENDICULAR TO LCD PANEL SURFACE)
             OPERATION CONDITION : ±45° (PERPENDICULAR TO LCD PANEL SURFACE)
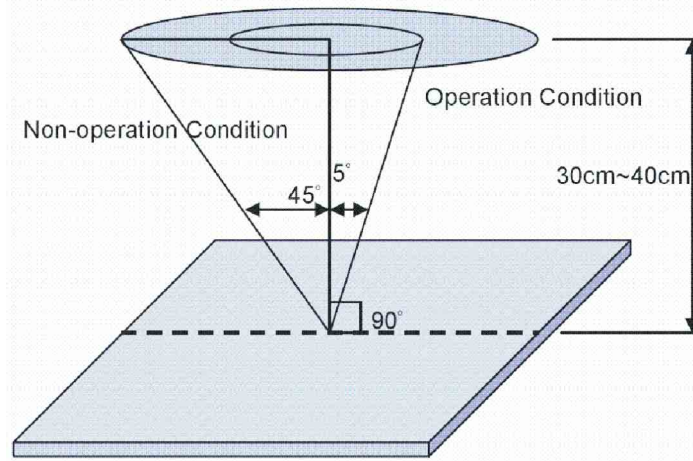
    12.2.2 ENVIRONMENT CONDITIONS :

AMBIENT TEMPERATURE		20°C~25°C
AMBIENT HUMIDITY		65±20%RH
AMBIENT ILLUMINATION	COSMETIC INSPECTION	MORE THAN 600Lux
	FUNCTIONAL INSPECTION	300~500 Lux

    12.2.3 INSPECTION LOT
          QUANTITY PER DELIVERY LOT FOR EACH MODEL

    12.2.4 INSPECTION METHOD
          A SAMPLING INSPECTION SHALL BE MADE ACCORDING TO THE
        FOLLOWING PROVISIONS TO JUDGE THE ACCEPTABILITY
        (A)APPLICABLE STANDARD : MIL-STD-105E
                   NORMAL INSPECTION, SINGLE SAMPLING
             LEVEL Ⅱ
        (B)AQL : MAJOR DEFECT : AQL 0.65
           MINOR DEFECT : AQL 1.0
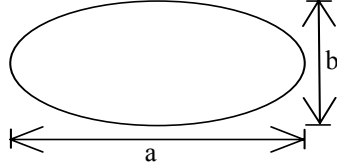
12.3 INSPECTION STANDARDS
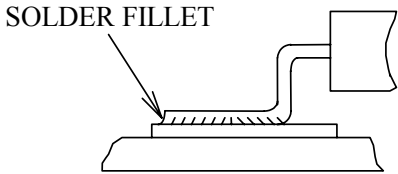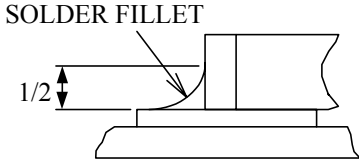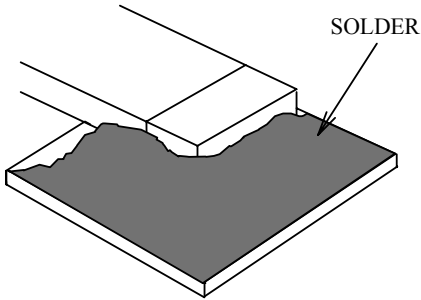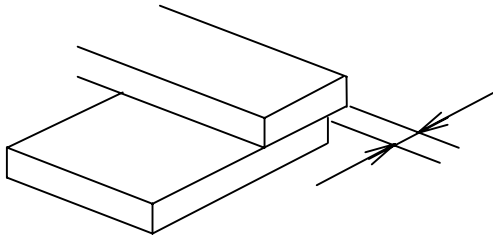
12.3.1 VISUAL DEFECTS CLASSIFICATION
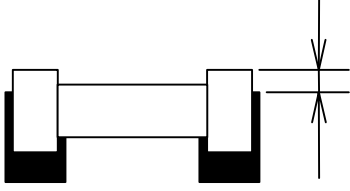
TYPE OF DEFECT	INSPECTION ITEM	DEFECT FEATURE	AQL
MAJOR DEFECT	1.DISPLAY ON	• DEFECT TO MISS SPECIFIED DISPLAY FUNCTION, FOR ALL AND SPECIFIED DOTS EX: DISCONNECTION, SHORT CIRCUIT ETC	0.65
	2.BACKLIGHT	• NO LIGHT • FLICKERING AND OTHER ABNORMAL ILLUMINATION	
	3.DIMENSIONS	• SUBJECT TO INDIVIDUAL ACCEPTANCE SPECIFICATIONS	
MINOR DEFECT	1.DISPLAY ZONE	• BLACK/WHITE SPOT • BUBBLES ON POLARIZER • NEWTON RING • BLACK/WHITE LINE • SCRATCH • CONTAMINATION • LEVER COLOR SPREED	1.0
	2.BEZEL ZONE	• STAINS • SCRATCHES • FOREIGN MATTER	
	3.SOLDERING	• INSUFFICIENT SOLDER • SOLDERED IN INCORRECT POSITION • CONVEX SOLDERING SPOT • SOLDER BALLS • SOLDER SCRAPS	
	4.DISPLAY ON (ALL ON)	• LIGHT LINE	

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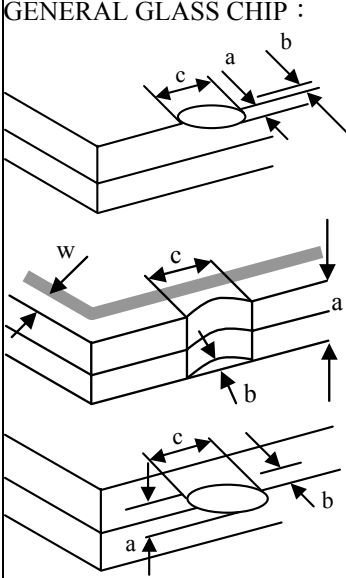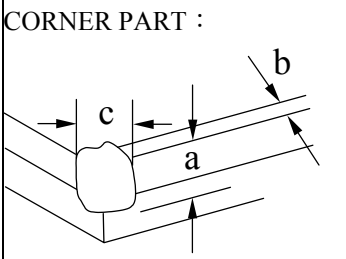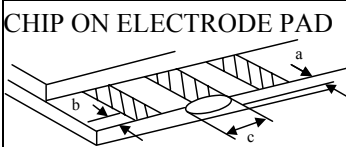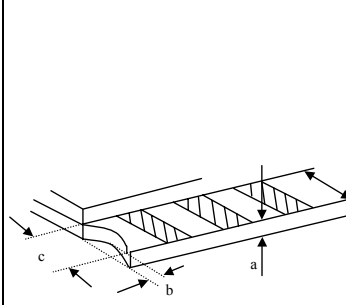
12.3.2 MODULE DEFECTS CALSSIFICATION

NO.	ITEM	CRITERIA
1.	DISPLAY ON INSPECTION	(1)INCORRECT PATTERN (2)MISSING SEGMENT (3)DIM SEGMENT (4)OPERATING VOLTAGE BEYOND SPEC
2.	OVERALL DIMENSIONS	(1)OVERALL DIMENSION BEYOND SPEC
3.	DOT DEFECT	(1) INSPECTION PATTERN: FULL WHITE, FULL BLACK, RED, GREEN AND BLUE SCREENS. (2) see table below

(2)

ITEMS	ACCEPTABLE COUNT
BRIGHT DOT	$N \le 2$
DARK DOT	$N \le 3$
TOAL BRIGHT AND DARK DOTS	$N \le 4$

NOTE：
1. THE DEFINITION OF DOT：
   THE SIZE OF A DEFECTIVE DOT OVER 1/2 OF WHOLE DOT IS REGARDED AS ONE DEFECTIVE DOT.
2. BRIGHT DOT：
   DOTS APPEAR BRIGHT AND UNCHANGED IN SIZE IN WHICH LCD PANEL IS DISPLAYING UNDER BLACK PATTERN.
3. DARK DOT：
   DOTS APPEAR DARK AND UNCHANGED IN SIZE IN WHICH LCD PANEL IS DISPLAYING UNDER PURE RED, GREEN, BLUE PICTURE.

4. FOREIGN BLACK/WHITE/ BRIGHT LINE/ SCRATCH OF VIEWING AREA

LENGTH：L	WIDTH：W	PERMISSIBLE NO.
$L \le 0.3$	$W \le 0.05$	IGNORE
$0.3 < L \le 2.5$	$0.05 < W \le 0.1$	4
$2.5 < L$	$0.1 < W$	NONE

WIDTH：W mm, LENGH：L mm

5. FOREIGN MATTER \ BLACK SPOTS \ WHITE SPOTS \ DENT (INCLUDING LIGHT LEAKAGE DUE TO POLARIZING PLATES PINHOLES, ETC.)

AVERAGE DIAMETER (mm): D	NUMBER OF PIECES PERMITTED
$D \le 0.1$	IGNORE
$0.1 < D \le 0.4$	4
$0.4 < D$	NONE

NOTE ：DIAMETER D=(a+b)/2

NO.	ITEM	CRITERIA		
6.	BUBBLES OF POLARIZER /DIRT/CF FAIL /SURFACE STAINS		AVERAGE DIAMETER (mm) : D	NUMBER OF PIECES PERMITTED
		BUBBLE ON THE POLARIZER	$D \leq 0.25$	IGNORE
			$0.25 < D \leq 0.5$	$N \leq 5$
			$0.5 < D$	NOTE
		SURFACE STATUS	$D < 0.1$ mm	IGNORE
			$0.1 < D \leq 0.3$mm	$N \leq 3$
		CF FAIL / SPOT	$D < 0.1$ mm	IGNORE
			$0.1 < D \leq 0.3$mm	$N \leq 3$

NOTE : (1)POLARIZER BUBBLE IS DEFINED AS THE BUBBLE APPEARS ON ACTIVE DISPLAY AREA. THE DEFECT OF POLARIZER BUBBLE SHALL BE IGNORED IF THE POLARIZER BUBBLE APPEARS ON THE OUTSIDE OF ACTIVE DISPLAY AREA.
(2)THE EXTRANEOUS SUBSTANCE IS DEFINED AS IT CAN BE OBSERVED WHEN THE MODULE IS POWER ON.
(3)THE DEFINITION OF AVERAGE DIAMETER, D IS DEFINED AS FOLLOWING.
AVERAGE DIAMETER (D)=(a+b)/2

NO.	ITEM	CRITERIA
7.	LINE DEFECT ON DISPLAY	OBVIOUS VERTICAL OR HORIZONTAL LINE DEFECT IS NOT ALLOW
8.	MURA ON DISPLAY	IT'S OK IF MURA IS SLIGHT VISIBLE THROUNG 6% ND FILTER
9.	UNEVEN COLOR SPREAD, COLORATION	(1)TO BE DETERMINED BASED UPON THE STANDARD SAMPLE.
10.	BEZEL APPEARANCE	(1)BEZEL MAY NOT HAVE RUST, BE DEFORMED OR HAVE FINGER PRINTS STAINS OF OTHER CONTAMINATION. (2)BEZEL MUST COMPLY WITH JOB SPECIFICATIONS.
11	PCB	(1)THERE MAY NOT BE MORE THAN 2mm OF SEALANT OUTSIDE THE SEAL AREA ON THE PCB, AND THERE SHOULD BE NO MORE THAN THREE PLACES. (2)NO OXIDATION OR CONTAMINATION PCB TERMINALS (3)PARTS ON PCB MUST BE THE SAME AS ON THE PRODUCTION CHARACTERISTIC CHART. THERE SHOULD BE NO WRONG PARTS, MISSING PARTS OR EXCESS PARTS. (4)THE JUMPER ON THE PCB SHOULD CONFORM TO THE PRODUCT CHARACTERISTIC CHART. (5)IF SOLDER GETS ON BEZEL TAB PADS, LED PAD, ZEBRA PAD OR SCREW HOLD PAD; MAKE SURE IT IS SMOOTHED DOWN.

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NO.	ITEM	CRITERIA

12.	SOLDERING	(1)NO SOLDERING FOUND ON THE SPECIFIED PLACE
		(2)INSUFFICENT SOLDER
		  (a)LSI, IC
		    A POOR WETTING OF SOLDER IS BETWEEN LOWER BEND OR "HEEL" OF LEAD AND PAD
		
		SOLDER FILLET
		
		  (b)CHIP COMPONENT
		    · SOLDER IS LESS THAN 50% OF SIDES AND FRONT FACE WETTING
		
		SOLDER FILLET
		1/2
		
		• SOLDER WETS 3 SIDES OF TERMINAL, BUT LESS THAN 25% OF SIDES AND FRONT SURFACE AREA ARE COVERED
		
		SOLDER
		
		(3)PARTS ALIGMENT
		  (a)LSI, IC
		    LEAD WIDTH IS MORE THAN 50% BEYOND PAD OUTLINE

NO.	ITEM	CRITERIA
12.	SOLDERING	(b)CHIP COMPONENT 　COMPONENT IS OFF CENTER, AND MORE THAN 50% OF THE LEADS IS OFF THE PAD OUTLINE (4)NO UNMELTED SOLDER PASTE MAY BE PRESENT ON THE PCB. (5)NO COLD SOLDER JOINTS, MISSING SOLDER CONNECTIONS, OXIDATION OR ICICLE. (6)NO RESIDUE OR SOLDER BALLS ON PCB. (7)NO SHORT CIRCUITS IN COMPONENTS ON PCB.
13.	BACKLIGHT	(1)NO LIGHT (2)FLICKERING AND OTHER ABNORMAL ILLUMINATION (3)SPOTS OR SCRATCHES THAT APPEAR WHEN LIT MUST BE JUDGED USING LCD SPOT, LINES AND CONTAMINATION STANDARDS. (4)BACKLIGHT DOESN'T LIGHT OR COLOR IS WRONG.
14.	GENERAL APPEARANCE	(1)NO OXIDATION, CONTAMINATION, CURVES OR, BENDS ON INTERFACE PIN (OLB) OF TCP. (2)NO CRACKS ON INTERFACE PIN (OLB) OF TCP. (3)NO CONTAMINATION, SOLDER RESIDUE OR SOLDER BALLS ON PRODUCT. (4)THE IC ON THE TCP MAY NOT BE DAMAGED, CIRCUITS. (5)THE UPPERMOST EDGE OF THE PROTECTIVE STRIP ON THE INTERFACE PIN MUST BE PRESENT OR LOOK AS IF IT CAUSE THE INTERFACE PIN TO SEVER. (6)THE RESIDUAL ROSIN OR TIN OIL OF SOLDERING (COMPONENT OR CHIP COMPONENT) IS NOT BURNED INTO BROWN OR BLACK COLOR. (7)SEALANT ON TOP OF THE ITO CIRCUIT HAS NOT HARDENED. (8)PIN TYPE MUST MATCH TYPE IN SPECIFICATION SHEET. (9)LCD PIN LOOSE OR MISSING PINS. (10)PRODUCT PACKAGING MUST THE SAME AS SPECIFIED ON PACKAGING SPECIFICATION SHEET. (11)PRODUCT DIMENSION AND STRUCTURE MUST CONFORM TO PRODUCT SPECIFICATION SHEET. (12)THE APPEARANCE OF HEAT SEAL SHOULD NOT ADMIT ANY DIRT AND BREAK.

NO.	ITEM	CRITERIA
15.	CRACKED GLASS	THE LCD WITH EXTENSIVE CRACK IS NOT ACCEPTABLE

THE LCD WITH EXTENSIVE CRACK IS NOT ACCEPTABLE

GENERAL GLASS CHIP：

a	b	c
$\leq t/2$	< VIEWING AREA	$\leq 1/8X$
$t/2 > , \leq 2t$	$\leq W/2$	$\leq 1/8X$

*W=DISTANCE BETWEEN
  SEALANT AREA AND LCD
  PANEL EDGE
 X = LCD SIDE LENGTH
 t = GLASS THICKNESS

CORNER PART：

a	b	c
$\leq t/2$	< VIEWING AREA	$\leq 1/8X$
$> t/2 , \leq 2t$	$\leq W/2$	$\leq 1/8X$

*W=DISTANCE BETWEEN
  SEALANT AREA AND LCD
  PANEL EDGE
 X = LCD SIDE LENGTH
 t = GLASS THICKNESS

CHIP ON ELECTRODE PAD

a	b	c
$\leq t$	$\leq 0.5mm$	$\leq 1/8X$

* X=LCD SIDE WIDTH
  t =GLASS THICKNESS

a	b	c
$\leq t$	$\leq 1/8X$	$\leq L$

*X=LCD SIDE WIDTH
 t = GLASS THICKNESS
 L=ELECTRODE PAD LENGTH
①IF GLASS CHIPPING THE ITO
  TERMINAL, OVER 2/3 OF THE ITO MUST
  REMAIN AND BE, INSPECTED
  ACCORDING TO ELECTRODE
  TERMINAL SPECIFICATIONS
②IF THE PRODUCT WILL BE HEAT
  SEALED BY THE CUSTOMER,
  THE ALIGNMENT MARK MUST NOT
  BE DEMAGED

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12.4   RELIABILITY TEST

12.4.1   STANDARD SPECIFICATIONS FOR RELIABILITY OF LCD MODULE

NO	ITEM	DESCRIPTION
1	HIGH TEMPERATURE OPERATION	THE SAMPLE SHOULD BE ALLOWED TO STAND AT +70°C FOR 240 HRS
2	LOW TEMPERATURE OPERATION	THE SAMPLE SHOULD BE ALLOWED TO STAND AT -20°C FOR 240 HRS
3	HIGH TEMPERATURE STORAGE	THE SAMPLE SHOULD BE ALLOWED TO STAND AT +80°C FOR 240 HRS
4	LOW TEMPERATURE STORAGE	THE SAMPLE SHOULD BE ALLOWED TO STAND AT -30°C FOR 240 HRS
5	HIGH TEMPERATURE / HIGH HUMIDITY STORAGE	THE SAMPLE SHOULD BE ALLOWED TO STAND AT 60°C, 90% RH 240 HRS
6	THERMAL SHOCK (NOT OPERATED)	THE SAMPLE SHOULD BE ALLOWED TO STAND THE FOLLOWING 10 CYCLES OF OPERATION : -40°C FOR 30 MINUTES +85°C FOR 30 MINUTES
7	ESD (ELECTROSTATIC DISCHARGE) (NOT OPERATED)	AIR DISCHARGE ± 12KV CONTACT DISCHARGE ± 8KV

NOTE (1)：THE TEST SAMPLES HAVE RECOVERY TIME FOR 2 HOURS AT ROOM
TEMPERATURE BEFORE THE FUNCTION CHECK. IN THE STANDARD
CONDITIONS, THERE IS NO DISPLAY FUNCTION NG ISSUE OCCURRED.

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12.5   TESTING CONDITIONS AND INSPECTION CRITERIA

FOR THE FINAL TEST THE TESTING SAMPLE MUST BE STORED AT ROOM TEMPERATURE FOR 24 HOURS, AFTER THE TESTS LISTED IN TABLE 12.5, STANDARD SPECIFICATIONS FOR RELIABILITY HAVE BEEN EXECUTED IN ORDER TO ENSURE STABILITY.

NO	ITEM	TEST MODEL	INSPECTION CRITERIA
1	CURRENT CONSUMPTION	REFER TO SPECIFICATION	THE CURRENT CONSUMPTION SHOULD CONFORM TO THE PRODUCT SPECIFICATION.
2	CONTRAST	REFER TO SPECIFICATION	AFTER THE TESTS HAVE BEEN EXECUTED, THE CONTRAST MUST BE LARGER THAN HALF OF ITS INITIAL VALUE PRIOR TO THE TESTS.
3	APPEARANCE	VISUAL INSPECTION	DEFECT FREE

12.6   OPERATION

12.6.1   DO NOT CONNECT OR DISCONNECT MODULES TO OR FROM THE MAIN SYSTEM WHILE POWER IS BEING SUPPLIED .

12.6.2   USE THE MODULE WITHIN SPECIFIED TEMPERATURE ; LOWER TEMPERATURE CAUSES THE RETARDATION OF BLINKING SPEED OF THE DISPLAY ; HIGHER TEMPERATURE MAKES OVERALL DISPLAY DISCOLOR . WHEN THE TEMPERATURE RETURNS TO NORMALITY , THE DISPLAY WILL OPERATE NORMALLY .

12.6.3   ADJUST THE LC DRIVING VOLTAGE TO OBTAIN THE OPTIMUM CONTRAST .

12.6.4   POWER ON SEQUENCE INPUT SIGNALS SHOULD NOT BE SUPPLIED TO LCD MODULE BEFORE POWER SUPPLY VOLTAGE IS APPLIED AND REACHES THE SPECIFIED VALUE.
IF ABOVE SEQUENCE IS NOT FOLLOWED , CMOS LSIS OF LCD MODULES MAY BE DAMAGED DUE TO LATCH - UP PROBLEM .

12.6.5   NOT ALLOWED TO INFLICT ANY EXTERNAL STRESS AND TO CAUSE ANY MECHANICAL INTERFERENCE ON THE BENDING AREA OF FPC DURING THE TAIL BENDING BACKWARDS!
DO NOT STRESS FPC AND IC ON THE MODULE!

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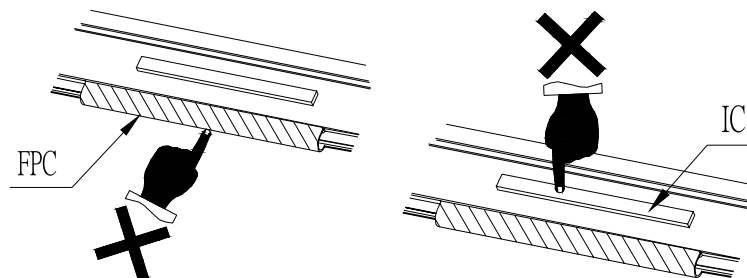
12.7   NOTICE

12.7.1   USE A GROUNDED SOLDERING IRON WHEN SOLDERING CONNECTOR I/O TERMINALS . FOR SOLDERING OR REPAIRING , TAKE PRECAUTION AGAINST THE TEMPERATURE OF THE SOLDERING IRON AND THE SOLDERING TIME TO PREVENT PEELING OFF THE THROUGH-HOLE-PAD .

12.7.2   DO NOT DISASSEMBLE . EDT SHALL NOT BE HELD RESPONSIBLE IF THE MODULE IS DISASSEMBLED AND UPON THE REASSEMBLY THE MODULE FAILED .

12.7.3   DO NOT CHARGE STATIC ELECTRICITY , AS THE CIRCUIT OF THIS MODULE CONTAINS CMOS LSIS. A WORKMAN'S BODY SHOULD ALWAYS BE STATIC-PROTECTED BY USE OF AN ESD STRAP . WORKING CLOTHES FOR SUCH PERSONNAL SHOULD BE OF STATIC-PROTECTED MATERIAL .

12.7.4   ALWAYS GROUND THE ELECTRICALLY-POWERED DRIVER BEFORE USING IT TO INSTALL THE LCD MODULE. WHILE CLEANING THE WORK STATION BY VACUUM CLEANER, DO NOT BRING THE SUCKING MOUTH NEAR THE MODULE ; STATIC ELECTRICITY OF THE ELECTRICALLY-POWERED DRIVER OR THE VACUUM CLEANER MAY DESTROY THE MODULE .

12.7.5   DON'T GIVE EXTERNAL SHOCK.

12.7.6   DON'T APPLY EXCESSIVE FORCE ON THE SURFACE.

12.7.7   LIQUID IN LCD IS HAZARDOUS SUBSTANCE. MUST NOT LICK AND SWALLOW. WHEN THE LIQUID IS ATTACH TO YOUR, SKIN, CLOTH ETC.WASH IT OUT THOROUGHLY AND IMMEDIATELY.

12.7.8   DON'T OPERATE IT ABOVE THE ABSOLUTE MAXIMUM RATING.

12.7.9   STORAGE IN A CLEAN ENVIRONMENT, FREE FROM DUST,ACTIVE GAS,AND SOLVENT.

12.7.10   STORE WITHOUT ANY PHYSICAL LOAD.

12.7.11   REWIRING：NO MORE THAN 3 TIMES .